

WHAT IS CLAIMED IS:

1           1. A method of positioning a main stent at a vessel bifurcation such  
2 that a side opening in the main stent is positioned at the ostium of a branch vessel,  
3 comprising:

4                 positioning a main guidewire in the main vessel such that a distal end of  
5 the main guidewire extends past the bifurcation;

6                 advancing a stent delivery system to a position proximate the bifurcation,  
7 the stent delivery system comprising a catheter with a flexible side sheath attached  
8 thereto, wherein the catheter is received over the main guidewire, and wherein the main  
9 stent is positioned over the catheter with the flexible side sheath positioned to pass  
10 through the interior of the main stent and out of the side opening in the main stent;

11                 advancing a branch guidewire through the flexible side sheath attached to  
12 the catheter and into the branch vessel; and subsequently,

13                 advancing the catheter over the main guidewire while advancing the  
14 flexible side sheath over the branch guidewire while viewing relative movement of a  
15 marker positioned on the flexible side sheath with respect to at least one marker  
16 positioned on the catheter, wherein the relative movement indicates that a portion of the  
17 flexible side sheath adjacent the side opening in the main stent is advancing into the  
18 ostium of the branch vessel, thereby indicating the position of the side opening of the  
19 main stent with respect to the ostium of the branch vessel.

1           2. The method of claim 1, wherein viewing relative movement of a  
2 marker positioned on the flexible side sheath with respect to at least one marker  
3 positioned on the catheter, comprises:

4                 viewing an increasing separation distance between the marker positioned  
5 on the flexible side sheath with respect to at least one marker positioned on the catheter as  
6 the catheter is advanced over the first guidewire while the flexible side sheath is  
7 simultaneously advanced over the second guidewire.

1           3. The method of claim 1, wherein,

2                 viewing the at least one marker positioned on the catheter comprises  
3 viewing markers positioned adjacent the distal and proximal ends of the main stent.

1           4. The method of claim 1, further comprising:

2                 at least partially deploying the main stent within the main vessel.

1                   5.       The method of claim 4, further comprising:  
2                   advancing a distal end of a second catheter over the branch guidewire and  
3                   into the branch vessel.

1                   6.       The method of claim 5, further comprising:  
2                   deploying a branch stent within the branch vessel, wherein the branch  
3                   stent is positioned on the distal end of the second catheter.

1                   7.       A method of positioning a main stent at a vessel bifurcation such  
2                   that a side opening in the main stent is positioned at the ostium of a branch vessel,  
3                   comprising:

4                   positioning a main guidewire in the main vessel such that a distal end of  
5                   the main guidewire extends past the bifurcation;  
6                   advancing a stent delivery system to a position proximate the bifurcation,  
7                   the stent delivery system comprising a catheter with a flexible side sheath attached  
8                   thereto, wherein the catheter is received over the main guidewire, and wherein the main  
9                   stent is positioned over the catheter with the flexible side sheath positioned to pass  
10                  through the interior of the main stent and out of the side opening in the main stent;  
11                  advancing a branch guidewire through the flexible side sheath and into the  
12                  branch vessel; and subsequently,  
13                  advancing the catheter over the main guidewire while advancing the  
14                  flexible side sheath over the branch guidewire such that the side opening in the main stent  
15                  is positioned at the ostium of a branch vessel.

1                   8.       The method of claim 7, wherein advancing the flexible side sheath  
2                   over the branch guidewire such that the side opening in the main stent is positioned at the  
3                   ostium of a branch vessel, comprises:

4                   advancing the flexible side sheath over the branch guidewire such that a  
5                   distal end of the flexible side sheath is advanced into the ostium of the branch vessel.

1                   9.       The method of claim 8, further comprising:  
2                   viewing relative movement of a marker positioned on the flexible side  
3                   sheath with respect to at least one marker positioned on the catheter, wherein the relative  
4                   movement indicates that a portion of the flexible side sheath adjacent the side opening in  
5                   the main stent is advancing into the ostium of the branch vessel, thereby indicating the

6 position of the side opening of the main stent with respect to the ostium of the branch  
7 vessel.

1 10. A stent delivery system for positioning a main stent at a vessel  
2 bifurcation such that a side opening in the main stent is positioned at the ostium of a  
3 branch vessel, comprising:

4 a first guidewire;

5 a catheter receivable over the first guidewire, the catheter having at least  
6 one marker positioned thereon;

7 a flexible side sheath attached to the catheter, the flexible side sheath  
8 having at least one marker positioned thereon; and

9 a second guidewire receivable through the flexible side sheath.

1 11. The stent delivery system of claim 10, further comprising:  
2 a main stent positioned on the catheter.

1 12. The stent delivery system of claim 10, wherein,  
2 the at least one marker positioned on the delivery system comprises a  
3 distal and a proximal marker.

1 13. The stent delivery system of claim 12, wherein,  
2 the at least one marker positioned on the delivery system comprises a  
3 medial marker positioned between the distal and proximal markers.

1 14. The stent delivery system of claim 10, wherein,  
2 the at least one marker positioned on the flexible side sheath comprises a  
3 marker positioned adjacent one of the at least one marker on the delivery system.

1 15. The stent delivery system of claim 10, further comprising:  
2 a second catheter receivable over the second guidewire.

1 16. The stent delivery system of claim 10, further comprising:  
2 a balloon positioned at a distal end of the catheter.

1 17. The stent delivery system of claim 15, further comprising:  
2 a balloon positioned at a distal end of the second catheter.

1                   18.     The stent delivery system of claim 10, wherein,  
2                   a marker positioned on the catheter is radiopaque.

1                   19.     The stent delivery system of claim 10, wherein, the marker is made  
2                   of made of gold.

1                   20.     The stent delivery system of claim 10, wherein, a marker  
2                   positioned on the flexible side sheath is radiopaque.

1                   21.     The stent delivery system of claim 19, wherein, the marker is made  
2                   of made of tungsten.

1                   22.     A stent delivery system for positioning a main stent at a vessel  
2                   bifurcation such that a side opening in the main stent is positioned at the ostium of a  
3                   branch vessel, comprising:

4                   a catheter having at least one marker positioned thereon; and  
5                   a flexible side sheath attached to the catheter, the flexible side sheath  
6                   having at least one marker positioned thereon.

1                   23.     A kit comprising:  
2                   an apparatus as in claim 10; and  
3                   instructions for use setting forth a method as in claim 1.